ON MAKING A PRINTING PRESS

by RALPH GREEN

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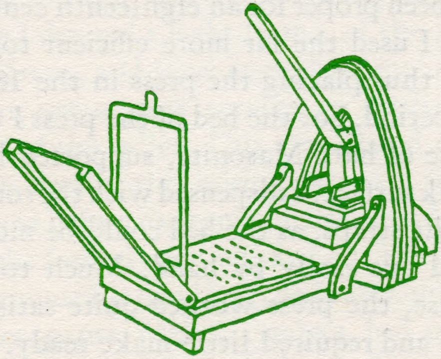
SOME twenty years ago, when I had occasion to study old wooden printing press construction, I was impressed by the ability of the artisans of that day, to make a printing press with so few tools, and probably not good tools at that. Wooden printing presses were built long before the introduction of machine tools. The hand tools available were those of the carpenter and blacksmith. Some ingenuity and a great deal of slow, painstaking labor was necessary to cut the threads of the screw of the spindle. Other parts were easy to make.

If it were possible to make such a press with hand tools, why couldn't I? I had a workshop, with all the usual hand tools and such skill as the average amateur might possess. Moreover, I had been without a press since my school days, and I thought it would be fun to own one again.

I decided that a platen and chase size of 6 by 9 inches would do for eveything I wanted to print. Unfortunately I had not run across anything in the literature of printing which would give me any indication of the required pressure to be exerted by the platen. I am a structural engineer and intended to design each part for a definite loading, so like the one-horse shay, under an overload, all parts would break at once. For such a small chase size, I decided that 1500 pounds pressure would be sufficient and made my plans accordingly. This was equivalent to about 28 pounds per square inch of platen area, and I was to learn later that a design unit load of from two to three times that figure should be used for a good strong hand press with the ability to print a full form. However,



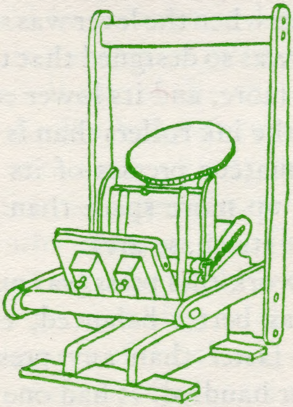
the press as built seemed to be of ample strength, although I have probably overloaded it at times.

Most of the press was made of oak, reenforced with steel bars and held together by bolts. I was fortunate in obtaining a piece of lightweight steel plate, with a polished finish on both sides, which I used for the underside of the wooden platen. Instead of using a screw for the spindle, which would have been proper for an eighteenth century press, I used the far more efficient toggle joint, thus placing the press in the 1815-1825 period. For the bed of the press I used a piece of hard Masonite, supported by a flat oak surface. I dispensed with the rounce and girt straps, as the bed could be moved in and out easily by hand. Much to my surprise, the press worked quite satisfactorily and required little make ready.

In using the press, I learned a few things about the operation of a hand press, or at least about this particular press. With almost any small form, even tho it was only slightly off center, it was necessary to place a bearer in the opposite end of the chase, so that the impression would be even and square. I had a few old cuts of assorted sizes, which I used for this purpose and which were turned face down in the form.

To insure even inking with a hand roller I soon discovered it was necessary to use some form of roller bearers. For this purpose I devised a light frame, of the proper thickness, and large enough to enclose the form, yet narrow enough to support the ends of the roller. This was placed on the form during the inking process, and removed before the tympan was closed down on the form. I soon worked out an efficient technique for handling the bearer, ink slab, roller, paper, frisket, tympan, bed and bar handle, each in turn, and was able to print at the rate of 300 per hour, or slightly better. Of course this rate could be maintained for short bursts of speed only.

This press was not large enough or strong enough to print anything of consequence, and I was limited to small items such as cards, stationery, announcements etc. A run of 300 or more involved too much time and effort, and the operation of the press, when the novelty wore off, ceased to be a pleasure if a run of more than 100 was involved. The next, and most logical step, was the making of a self-inking press, to take care of the longer runs of the smaller items. Accordingly I made plans for a typical amateur press with vertical bed and revolving ink disk. I designed this press for a unit pressure of about 80 pounds per square inch of chase area, which proved to be ample. However, as most of the frame was wood, and as the main members had to be somewhat bulky to withstand the stresses, the maximum chase area was limited to 25 square inches, or slightly more than 4x6. It took about six months of my spare time to make this press, and again, it was made with ordinary hand tools. The bearings, of course, were metal, and there was quite a bit of iron bar reenforcing, with some parts made of pipe and pipe fittings. I even made the ink disk. This was made of wood, covered with polished sheet steel,



and the ratchet teeth were cut out of a circle of thin band iron. The principle of operation was much like that of the Pilot press, with fairly heavy side arms. Instead of one side lever, however, I used two, one on each side, with a connecting bar across the top. I incorporated one or two improvements. A large spiral spring (it was a valve spring from an old gas engine) combined with a piece of foam rubber, made an excellent shock absorber when the lever was released, and the press was so designed that the platen opened up more, and its lower edge was further from the ink rollers than is the case with other amateur presses of its size. In size, it took up more space than an iron press of twice its chase area.

For small work this press was quite successful. It was better balanced, easier to operate, and faster than any press of its size I had ever handled. It had one failing. In the course of time the wooden parts shrunk slightly, or otherwise got out of line. Knowing its construction thoroughly, however, I could make satisfactory adjustments whenever necessary.

This press was far too small, however,

and I wanted a press large enough to print two pages at a time. Speed was secondary as I didn't plan to print many copies. I decided a good strong hand press of the Washington type and about 10x15 chase size would be sufficiently large. Furthermore, it is possible to print a form of almost the full size of the chase on a hand press of the Washington type. This is not possible with a self-inking press employing an ink disk, as approximately the center seven-tenths only, of the form, receives perfect inking. Roughly speaking, the extent of good inking is about equal to half of the area of the chase, or somewhat less than the area of a square which can be placed within the outline of the ink disk.

I made plans for a press to be made of wood, iron, wrought pipe, brass, and other miscellaneous materials. It was a cross between a Washington hand press and a Rube Goldberg concoction. Unfortunately, the late war had started before my plans were finished, and I found that (a) I didn't have the time to spend in my workshop, and (b) I couldn't get materials. There were priorities required for everything. I had to give the idea up.

Later, I had a chance to buy a 6 x 9 Sigwalt. This was a nice little amateur type self-inking press, and it operated quite satisfactorily. It wasn't large enough to print a sizable sheet, however.

About a year ago I saw an advertisement offering an 8x12 Golding hand press. I had known that amateur presses of this comparatively large size were made in the past; in fact, I had pictures of them and two old Golding catalogs showing the full line. This press turned out to be the rather rare type made for printing notes on large drawings and similar work. The platen is fixed and almost horizontal. The entire upper part of the press consisting of bed, ink disk, roller arms, etc., is hinged at its lower edge. When the long side lever is pulled down, most of the machine bends over, to make the impression on the platen, and if you are standing close to it you get the impression that the ink disk is about to hit you in the face. Two large strong springs on either side control the movement and make it surprisingly easy to operate. The lettering on the side of the bed, "Golding & Co., Boston," indicates that the press is about 55 years old.

I bought the press, took it apart, gave it a good cleaning, polished up the bright surfaces, and gave it two coats of enamel. After this treatment it looked as good as new. This is the press I have now.

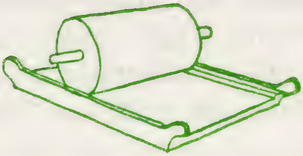
Some five years ago, when Colonial Williamsburg established their 18th century printing office, I had the pleasure of preparing the detail plans of the Common

English Press which is now in use in the shop. The press is a composite of four 18th century presses in museums in this country supplemented by such data as I had acquired from twenty years study of the subject. Amateurs with a strong desire to build a press have corresponded with me and discussed the feasability of making a wood press with an iron screw, similar to the 1750 - 1815 style. I have discouraged the making of a press of this exact type. The screw would be difficult to cut for any machine shop, as it has a very coarse thread with a descent of over two inches in one revolution. Furthermore, the operation of a screw press is inefficient and would be very tiring. An adaptation of the toggle joint, to suit materials and methods available to the amateur, would be much easier of accomplishment, and would result in a more efficient and easier operating press. It would be much more powerful than the screw spindle; in fact, there would be some danger of weakening the frame of the press.

In England in the early days of the last century, after Charles, third Earl Stanhope had invented the first iron press by combining the toggle joint with the screw, some English press makers continued to make wooden presses, but with the Stanhope mechanism. The idea was not entirely successful, as the toggle joint exerted so much power, the wooden frames, in many instances, could not withstand the pressure. However, in those days, the method of figuring exact stresses in the timber work was unknown and the frames were not provided with sufficient strength to take an exact maximum platen pressure. If a small, heavy wooden press were designed for a known platen pressure, no such difficulty should result.

Of course, if the amateur had the facilities of a metal working shop, with welding equipment, he could make his press entirely of iron and steel. He would save much time and money, however, if he scoured the second hand market and found an old Washington at a reasonable price.

If an amateur wanted a press with a comparatively large chase size, and wasn't too particular about the quality of his press work, he might well consider a galley proof press. A great many were made in the past and are still on the market. They have a bed size of about 10 x 30 or larger. They are simple, hand operated cylinders, about nine inches in diameter, running on iron rails on an iron bed. They would, of



course, require hand inking with a brayer, and in speed of operation may be slightly faster than a Washington. Some means would have to be provided for getting good register, but by the exercise of some ingenuity this could be worked out.

It may be interesting to recall at this point, that the first amateur presses regularly made and sold in this country were of the cylinder type. The Lowe, with conical shaped roller, was patented in 1856. Ben Grauer, of NBC, has one and uses it occasionally. The Adams Cottage Press, similar to a simple proof press but with the cylinder fixed and a sliding bed, appeared in 1860. Amateur platen presses with vertical beds were not made before 1869.

A number of years ago you could buy for fifty cents, instructions for making a press. The press was of the proof press type, with the roller made of a round

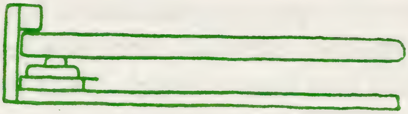
Quaker Oats box filled with concrete, and a piece of broom stick through it to serve as a handle. The bed and cylinder bearers were to be made of hard wood. A specimen printed on this press indicated that it would at least print, but the quality of the press work left much to be desired.

Art stores sell a simple contraption made of wood and iron, for use in printing linoleum blocks. A quick study of the probable strength of the mechanism leaves you wondering how it can possibly exert any appreciable force between the block and the platen. Linoleum blocks usually have masses of dark areas, requiring two or three times as much platen pressure as solid type matter. Maybe the users are satisfied with a gray, speckled impression. One of these presses may serve as a good example of what not to do when building a small, serviceable, strong press.

Probably a better, makeshift press for

printing linoleum blocks, as well as type matter, consists of an old iron letter press with screw-down platen actuated by a wheel or bar at the top. The writer once saw one of these arranged with a sliding bed, tympan and frisket, and provided with a larger iron wheel at the top. It appeared to be operating satisfactorily, altho it was slower, and more force was required than if it had been a toggle joint press.

An article in an early issue of the Saint Nicholas magazine described a press made by a country boy who had acquired some type thrown out by the local newspaper. He used a heavy plank about twelve inches wide by five feet long. About nine inches of one end constituted the bed, on which was placed the chase. Above this the platen was hinged to the end of the plank. An iron strap arrangement surrounded the bed and platen, and between this strap and the platen was inserted a 2 by 4 about four feet long. A block attached to the top of the platen was so located that the leverage ratio was about 50 to 1. A force of about 40 pounds applied to the bar handle exerted a pressure of 2000 pounds on the platen, which was enough for the purpose.



An English text book on the subject of printing in the schools, contains sketches of a somewhat similar, but obviously less powerful, homemade press.

And this concludes my remarks on the making of a printing press. If you have a desire to make such a press, I wish you luck. You will have a lot of fun, and if the press works, an immense satisfaction.

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